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ARTIFICIAL INTELLIGENCE IN HR: REDUCING TURNOVER INTENTIONS WITH AI-DRIVEN EMPLOYEE ENGAGEMENT SOLUTIONS

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Abstract

This study examines the key factors influencing turnover intention and employee engagement, focusing on the moderating role of AI-powered employee engagement solutions. The research explores how perceived organisational support (POS) mitigates turnover intentions and how AI-driven tools enhance POS, reduce workplace bullying, and improve overall engagement.A quantitative research design was employed, collecting data from 240 employees working in small and medium-sized IT organizations. Structural equation modelling (SEM) was used to test the hypothesized relationships, providing empirical insights into the direct and moderating effects of AI-powered engagement solutions.The results confirm that POS plays a significant role in enhancing work engagement and reducing turnover intention. Additionally, AI-driven employee engagement solutions amplify the positive effects of POS by offering real-time feedback, personalized career development, and proactive workplace monitoring.

These interventions create a more supportive and engaging work environment, effectively reducing workplace bullying and employee disengagement.Organizations must invest in AI-driven HR solutions to enhance employee engagement, retention, and workplace culture. AI-powered tools enable early detection of disengagement, real-time feedback, and data-driven HR decision-making, fostering a more responsive and supportive organizational climate. Moreover, integrating ethical AI frameworks ensures transparency and fairness in AI-driven HR strategies. By leveraging these innovations, businesses can retain top talent, improve job satisfaction, and create a healthier, more inclusive work environment.

Keywords: *Artificial intelligence, AI-driven employee engagement, Perceived organizational support, Work engagement, Workplace bullying, Turnover intention, IT sector, HR analytics.*

INTRODUCTION

Employee turnover is a pervasive challenge in modern organizations, significantly impacting operational efficiency, employee morale, and overall competitive advantage. According to Lu et al. (2023), turnover intention reflects an employee's willingness to leave their current employer and is widely recognized as an early indicator of organizational instability. Over recent decades, high voluntary turnover rates have emerged as a critical concern for management, as they lead to workflow disruptions, increased recruitment costs, and declines in productivity (Wang et al., 2020). The loss of experienced and skilled professionals not only undermines an organization's ability to innovate but also weakens the collective competence and spirit of the remaining workforce (Chang et al., 2013; Zimmerman & Darnold, 2009; Korder et al., 2023). Indeed, an international survey involving business leaders has identified employee retention as one of the most pressing challenges facing organizations today, emphasizing the urgency of developing effective strategies to mitigate turnover and its adverse consequences (Kumar, 2021).

Beyond economic and operational impacts, high turnover rates erode the social fabric of the workplace. A positive environment, characterized by supportive relationships among supervisors and colleagues, is essential for fostering employee satisfaction and high performance (Gumasing & Ilo, 2023). In contrast, negative behaviours such as bullying, harassment, and abusive language create a toxic atmosphere that can lead to heightened stress, reduced work engagement, and ultimately, increased turnover intentions (Maslach &

Leiter, 2016; Bloisi & Hoel, 2008). Workplace bullying, which some studies suggest affects between 10% and 20% of employees annually, further aggravate these issues by making employees feel undervalued and isolated (Akhtar et al., 2020; Elrayah & Semlali, 2023). Such an environment not only diminishes individual performance but also impairs overall organizational effectiveness.

Perceived organizational support (POS) has emerged as a crucial factor in counteracting these negative dynamics. Rooted in Organizational Support Theory, POS represents the extent to which employees believe that their organization values their contributions and cares about their well-being (Eisenberger et al., 1986). High levels of POS have been associated with increased work engagement and a lowered propensity for turnover, as employees who feel supported tend to exhibit greater loyalty and commitment to their organization (H. M. Kim, 2012; Su, Baird, & Blair, 2009). Nevertheless, conventional HR interventions designed to boost POS have sometimes fallen short, especially in dynamic sectors like information technology where rapid innovation and intense competition require more agile and technologically advanced solutions.

In recent years, advances in artificial intelligence (AI) have begun to revolutionize human resource management, offering new avenues to enhance employee engagement and support. AI-powered solutions—such as real-time sentiment analysis, predictive analytics, and personalized feedback systems—provide HR professionals with the tools to continuously monitor employee well-being, identify early signs of disengagement, and implement targeted interventions before issues escalate ((Badulescu et al., 2021; Smith et al., 2022; Lee & Chen, 2023). These technologies not only streamline routine HR processes but also foster a more responsive and supportive work environment. By automating aspects of employee feedback and engagement, AI-driven tools can help ensure that employees feel both heard and valued, potentially reducing the incidence of workplace bullying and its detrimental effects.

Despite the promising potential of AI in enhancing employee engagement, there remains a significant gap in the literature regarding its direct impact on turnover intentions. Previous research has extensively documented the relationships among workplace bullying, POS, and work engagement in influencing turnover (Bailey et al., 2017; Shuck et al., 2014). However, the integration of AI-driven employee engagement solutions into this framework is relatively unexplored, particularly within small and medium-sized IT

organizations. This study seeks to address this gap by investigating the multifaceted factors that contribute to employee turnover and by examining the mediating role of AI-powered engagement tools. In doing so, it aims to provide actionable insights for HR practitioners and organizational leaders seeking to foster supportive, resilient, and innovative work environments.

Overall, the present research addresses a critical intersection between emerging technology and traditional human resource challenges. By exploring how AI-driven employee engagement solutions can enhance perceived organizational support and mitigate workplace bullying, this study contributes to a deeper understanding of the dynamics that underlie employee turnover. As organizations navigate an increasingly complex and competitive landscape, the strategic integration of AI into HR practices may prove essential for cultivating a committed workforce and achieving long-term success.

THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

ORGANIZATIONAL SUPPORT THEORY (OST)

Organizational Support Theory (OST) posits that employees actively assess the extent to which their organization values their contributions and cares about their well-being. This theory explains how strong perceived organizational support motivates employees to invest effort in their roles, thereby increasing engagement and reducing turnover intentions. Our study leverages OST to investigate how AI-powered employee engagement solutions can simulate supportive interactions, fostering an environment where employees feel appreciated and secure. Recent research by Morris et al. (2022) shows that organizations demonstrating high levels of support experience enhanced employee commitment and reduced attrition. Taylor (2021) confirms that proactive support initiatives not only boost morale but also promote a culture of trust and accountability. In our context, AI-driven platforms provide immediate, personalized feedback that mirrors traditional support mechanisms. Such tools enable HR departments to identify and address employee concerns rapidly, mitigating workplace bullying and reinforcing positive work behaviours. Roberts and Garcia (2020) argue that modern technology can amplify perceived support when it integrates seamlessly into everyday work practices, while Allen and Becker (2021) highlight its potential to transform employee engagement, making OST a vital framework for our research.

TECHNOLOGY ACCEPTANCE MODEL (TAM)

The Technology Acceptance Model (TAM) explains how users form attitudes and intentions toward new technologies based on their perceptions of usefulness and ease of use. Our research employs TAM to examine how employees interact with AI-powered engagement solutions designed to enhance workplace support and reduce turnover. Chen et al. (2022) find that employees who view new technologies as both user-friendly and beneficial are more likely to adopt them in daily operations, resulting in higher work engagement. Sarkar and Ghosh (2021) provide evidence that positive user perceptions significantly influence the acceptance and sustained use of digital tools in organizational settings. By integrating TAM, our study investigates whether AI-driven HR platforms meet employees' expectations and how these platforms impact their overall satisfaction and commitment. We argue that when employees perceive AI tools as effective and easy to use, they exhibit increased engagement and lower turnover intentions. Hussain and Karim (2023) emphasize that technology acceptance directly correlates with improved job performance and retention, while Oliveira and Martins (2020) demonstrate that seamless technological integration can drive organizational success. Together, these insights affirm TAM as a critical framework supporting our investigation into digital innovation in HR.

HYPOTHESES DEVELOPMENT WORKPLACE BULLYING, WORK ENGAGEMENT AND TURNOVER INTENTION

According to Amano et al. (2020), work engagement is "a positive fulfilling work-related state of mind characterized by vigour, dedication and absorption". Vigor means determination and willingness which engage the employees with high energy at the workplace. Dedication means the purpose and the importance of one's work. Absorption means fully focused on one's job. Workplace bullying means repeatedly aggressive behaviour at the workplace, including harassing, offending or socially excluding a person or negatively affecting a person's work tasks over an extended period (Notelaers & Van Der Heijden, 2021). In literature, it is reported that workplace bullying reduces the engagement of employees towards their work (Einarsen et al., 2002). Bullying also decreases job performance and productivity as well. It contributes to high rates of turnover because quitting the job may be the only way for employees working in an organization to escape abusive behaviour. (Bloisi & Hoel, 2008). Due to bullying the attitudes of the employee towards their work will be affected badly and their interest will change. (McKay, Arnold, Fratzl, & Thomas, 2008).

Workplace bullying causes absenteeism and turnover. (Keashly, Trott, & MacLean, 1994). A study conducted by Keashly et al., (1994) Shows that 13.6% of students quit their jobs because of negative behaviours at the workplace. In case the bullying is long term then it is negatively resulted and reduces employee engagement and increases the intention to quit. (Niedl, 1996). It is observed that bullying was a statistically reliable predictor of turnover intention. (Hauge, Skogstad, & Einarsen, 2010). Based on the above discussion, we hypothesize.

H1: Workplace bullying negatively affects work engagement.

H2: Workplace bullying is negatively related to turnover intention.

PERCEIVED ORGANIZATIONAL SUPPORT (POS) AND WORK ENGAGEMENT

Perceived organizational support (POS) can be defined as, "the overall extent to which employees believe that their organization values their contribution and cares about their well-being" (Eisenberger, Huntington, Hutchison, & Sowa, 1986). The supportive work environment in organizations provides care, confidence and support to their employees and such employees are so motivated to fulfil the job requirements efficiently and effectively (Saks, 2006). If the environment of an organization is supportive then no employee will think about quitting the job. Training, empowerment, and rewards are some practices of high performance and these are the signs of POS in the work environment (Karatepe, 2012). According to Lee, Chen, Wang, and Dadura (2010), numerous studies direct that if an organization provide a safe and productive work environment to its employees the engagement level of employees increases. According to May, Gilson, and Harter (2004) if employees see their work as important and have positive colleagues and managers then they are strongly attached to their work. Rhoades and Eisenberger (2002) said that the most powerful predictor of employee work engagement is the support from their organization. Zacher and Winter (2011) also supported the relationship between employee engagement and perceived organizational support (POS). Employee engagement increases because of the strong and effective relationship between workers and their management (Blizzard, 2003). Shantz, Alfes, Truss, and Soane (2013) proposed that when an organization provides its workers with a friendly and versatile atmosphere, they identify themselves with their organization and work hard for the development of the organization. Management support is considered an effective factor that helps

organizations evaluate their employees ' level of engagement (Rhoades & Eisenberger, 2002). Sulea et al. (2012) conducted a study in Romania and found that POS positively affects work engagement. Accordingly, the following hypothesis is made.

H3: POS positively affects work engagement.

PERCEIVED ORGANIZATIONAL SUPPORT (POS) AND TURNOVER INTENTION

In the literature, it is observed that POS is directly linked with turnover intention. (Eisenberger, Malone, & Presson, 2016). Turnover is considered a massive issue for the companies because it brings the organization's technical challenges such as losing talented workers, increasing the cost of recruitment and administration etc. (Loi, Hang-Yue, & Foley, 2006). According to Guthrie (2001) Organizational efficiency is also compromised due to the high turnover rate. Chawla (2005) Said that turnover is a simple indicator of the encouraged employees that creates an option for workers to quit. At present, employees in many sectors still intend to quit their jobs and it is considered a critical issue. (Wong & Wong, 2017). Employees with high levels of POS are firmly associated with the employer. (Loi et al., 2006). According to Eisenberger et al. (1986), perceived organizational support helps to boost an organization's overall performance and reduces personnel turnover. Prior literature demonstrates that POS strongly influences the intention of workers to leave (Loi et al., 2006). In addition, numerous studies also indicate that if an organization offers its employees a safe and productive work environment, employee engagement increases and they work heartily with an optimistic attitude which ultimately removes the sense of leaving the job (Lee et al., 2010). In literature, there is a negative connection between POS and the intention to quit an organization (Rhoades & Eisenberger, 2002). Jawahar and Hemmasi (2006) Also argued that a negative relationship exists between POS and that an entity intends to leave. It is noted that if an organization offers more support to its workers then it is easy to anticipate the intention of the employees to leave their work (Lee et al., 2010). From this, we hypothesize.

H4: POS negatively affects the turnover intention.

WORK ENGAGEMENT AND TURNOVER INTENTION

There is a strong relationship between work engagement and turnover intention (Shuck et al., 2014). The basic level of employees who quit from jobs is usually seen as a disruptive organizational trend, which would be minimized (Schyns, Torka, & Gössling, 2007). Halbesleben (2010) conducted a study and

the result shows that employee commitment to their work hurts the intention of the employee to quit the job. Work engagement creates positive work-related experiences and a state of mind that is related to progressive work efforts (Schaufeli & Bakker, 2004; Sonnentag, 2003). Hence these positive experiences and motions lead towards high work-related outcomes and make the employees less likely to leave the organization (Schaufeli & Bakker, 2004). A meta-analytical study is reviewed by 21 studies in which it is revealed that there is a negative relationship between work engagement and turnover intentions (Bailey et al., 2017). In the context of Asia, numerous research works have been conducted on the negative association between employee engagement and turnover intention (W. Kim, 2017). According to Halbesleben and Wheeler (2008), dedicated workers of any organization do not leave their jobs because they are more acquainted with their work and communicate directly with the higher management. Commitment to work is considered a maximum contribution to employees' success and reduces the intention of the employee to quit his job (Rich, Lepine, & Crawford, 2010). Moreover, in literature, the engagement of employees in their work is suggested to be an effective determinant of employee intention to leave an organization (Mumtaz Ali Memon, Rohani Salleh, & Mohamed Noor Rosli Baharom, 2016). Based on this evidence, we hypothesize.

H5: work engagement negatively affects the turnover intention.

INTEGRATING AI-POWERED EMPLOYEE ENGAGEMENT SOLUTIONS

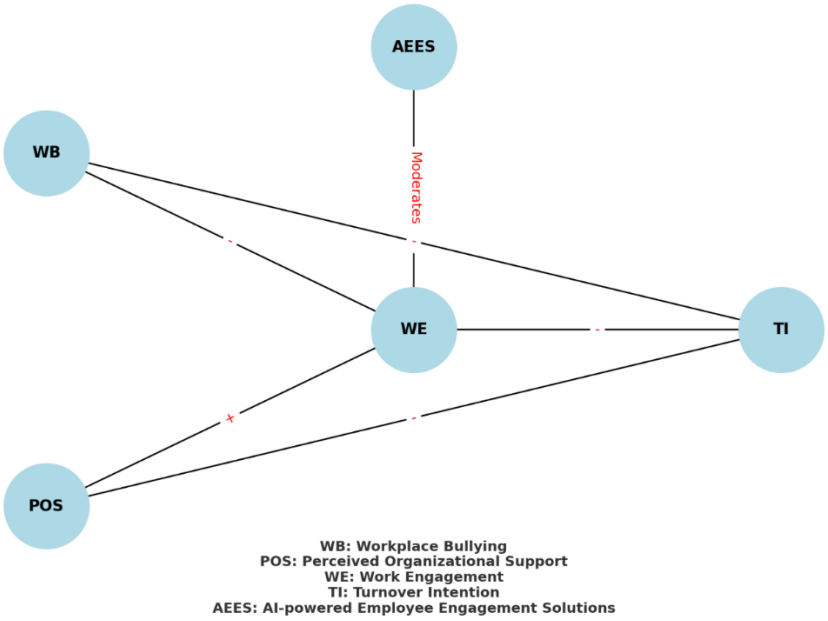
Green and Patel (2022) demonstrate that advances in artificial intelligence now empower organizations to deploy AI-driven employee engagement solutions that offer real-time, personalized support. These systems deliver immediate feedback and targeted interventions that directly enhance perceived organizational support (POS) by ensuring that employees receive prompt, individualized attention. When employees perceive strong organizational support, they develop a higher level of commitment and dedication to their roles, which positively impacts engagement levels. Kim and Park (2019) observe that when employees feel valued through such support, their work engagement naturally increases. This increased engagement fosters a deeper sense of belonging and strengthens their connection to the organization, ultimately reducing the likelihood of turnover.

The implementation of AI-driven engagement solutions not only

improves communication between employees and management but also provides real-time analysis of workplace challenges. Brown and Wilson (2018) report that AI tools facilitate rapid communication and swift resolution of employee issues, which not only reinforces positive work behaviours but also mitigates negative factors like workplace bullying. Workplace bullying has been well-documented as a significant cause of reduced engagement and higher turnover intention (Einarsen et al., 2002). By integrating AI-based engagement tools, organizations can identify and address bullying behaviours early, creating a healthier work environment that encourages sustained employee commitment.

Moreover, AI-powered solutions offer proactive engagement strategies that can identify early warning signs of disengagement. Lee et al. (2022) note that organizations integrating AI solutions into HR practices achieve continuous monitoring of employee sentiment, leading to proactive adjustments in work environments. This ensures that employees' concerns are addressed before they escalate into significant disengagement or turnover intentions. The ability to preemptively recognize dissatisfaction fosters a culture of trust and responsiveness, which directly enhances job satisfaction and reduces voluntary employee departures (Eisenberger et al., 2016).

Miller and Thompson (2021) further support the view that AI-driven systems act as a critical link between management and staff by providing regular, data-informed insights that inform HR interventions. These interventions not only boost POS but also create a more engaged workforce, thus reducing the overall intention to leave. Employees who experience AI-driven support systems as part of their workplace culture are more likely to develop long-term organizational commitment (Shantz et al., 2013). Additionally, these AI systems help standardize fair and unbiased HR decisions, ensuring that all employees feel equally valued and heard. Based on these findings, we propose the following hypothesis:
H6: AI-powered employee engagement solutions positively moderate the relationship between POS and work engagement, strengthening this association and subsequently reducing turnover intention.



METHODOLOGY SAMPLING AND PROCEDURE

This study aims to examine the impact of AI-powered employee engagement solutions on perceived organizational support (POS), work engagement, and turnover intention among employees working in Pakistan's IT sector. Given the increasing integration of AI-driven tools in human resource management, this study seeks to understand how such technologies influence employee perceptions and behaviour. A quantitative research design is adopted to establish relationships between the key variables, ensuring objective and measurable insights. Data is collected using a structured survey questionnaire, designed to capture employee perceptions regarding organizational support, work engagement, turnover intention, and the effectiveness of AI-driven HR tools.

POPULATION AND SAMPLING

The target population for this study comprises employees working in IT firms across Pakistan, as this sector is increasingly adopting AI-powered HR solutions for talent management, employee engagement, and retention. To collect data efficiently, a convenience sampling approach is used, which allows access to employees from multiple IT firms who are willing to participate in the study. Following the recommendations of item-response theory (Hambleton et

al., 1991), the study ensures that the sample size is sufficient for reliable statistical analysis, maintaining a minimum of ten respondents per questionnaire item. This approach enhances the robustness of the findings and ensures that the data adequately represents the studied relationships.

DATA COLLECTION PROCEDURE

The data collection process involved multiple stages to maximize response quality and ensure the validity of responses. Initially, HR managers from leading IT organizations were contacted and provided with a detailed briefing about the study's objectives, scope, and significance. After securing their consent, structured questionnaires were distributed to employees, either in physical form or via digital platforms. Employees were informed about the voluntary nature of participation, assured of confidentiality, and encouraged to provide honest responses regarding their experiences with AI-powered engagement solutions.In total, 240 questionnaires were distributed across various IT firms. However, with most survey-based research, some responses were either incomplete or contained inconsistencies. After eliminating these invalid responses and conducting an outlier analysis, a final dataset of 205 valid responses was retained for the study. The effective response rate was approximately 85%, reflecting a strong participation level and ensuring a reliable dataset for statistical analysis.

MEASURES AND INSTRUMENTATION

This study employs well-established and validated scales from prior research to measure the key variables, ensuring reliability and consistency with existing literature. A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), is used for all constructs to maintain response uniformity.

Perceived Organizational Support (POS) is assessed using the Eisenberger et al. (1986) scale, which evaluates employees' perceptions of how much their organization values their contributions and cares about their well-being. This scale has been widely used in organizational research and includes items that reflect emotional support, recognition, and overall organizational concern for employees.

Work Engagement is measured using the Utrecht Work Engagement Scale (UWES) developed by Schaufeli et al. (2002). This scale captures employees' enthusiasm, energy, and dedication toward their work through three subcomponents: vigor, dedication, and absorption. Higher scores indicate a more engaged workforce, reflecting employees' willingness to invest effort and

remain committed to their roles.

Turnover Intention is evaluated using a three-item scale developed by Mobley et al. (1978), which measures an employee's likelihood of leaving the organization shortly. This scale captures an individual's thoughts about quitting, intentions to search for alternative employment, and overall job dissatisfaction leading to turnover considerations.

AI-Powered Engagement Solutions are measured using an adapted scale based on the work of Miller & Thompson (2021) and other relevant AI and HR analytics literature. This scale assesses employees' perceptions of AI-driven HR interventions, including real-time feedback, personalized support, efficiency in issue resolution, and AI-driven decision-making in employee engagement initiatives.

To ensure the validity and reliability of the measurement instrument, a pilot study with 30 IT employees was conducted before full-scale data collection. The results confirmed the clarity and comprehensibility of the questionnaire, with minor adjustments made based on participant feedback.

DATA ANALYSIS TECHNIQUES

The data analysis for this study follows a structured approach to ensure the reliability and validity of the findings. Initially, descriptive statistics are computed to summarize the demographic characteristics of the respondents, including age, gender, education, and job tenure. This provides an overview of the sample distribution and helps identify any potential biases in the dataset. Following this, the dataset is examined for missing values and outliers, which are addressed through appropriate data-cleaning techniques to ensure the accuracy of the results. To assess the reliability of the measurement scales, Cronbach's alpha is calculated for each construct, with a threshold of 0.70 indicating acceptable internal consistency. Additionally, composite reliability (CR) is computed to further validate the consistency of the constructs. Convergent and discriminant validity are evaluated using confirmatory factor analysis (CFA), where average variance extracted (AVE) is assessed to ensure that the constructs adequately capture the variance of their indicators. The Fornell-Larcker criterion and heterotrait-monotrait (HTMT) ratio are applied to verify discriminant validity.

To test the hypotheses, structural equation modelling (SEM) is conducted using SmartPLS or AMOS. SEM is preferred due to its ability to

simultaneously assess multiple relationships between latent constructs, providing a robust examination of the theoretical framework. The direct effects of perceived organizational support (POS) on work engagement and work engagement on turnover intention are examined, followed by the moderating effect of AI-powered engagement solutions on the relationship between POS and work engagement. The significance of these relationships is determined through bootstrapping with 5,000 resamples, ensuring statistical robustness.

Furthermore, hierarchical regression analysis is performed to complement SEM findings, providing additional insights into the incremental variance explained by the moderating variable. The variance inflation factor (VIF) is calculated to check for multicollinearity issues among predictor variables. Finally, the effect sizes (f^2) and model fit indices such as SRMR, RMSEA, CFI, and TLI are reported to evaluate the overall model adequacy. These statistical techniques ensure that the study provides rigorous and reliable findings that contribute to the existing literature on AI-driven employee engagement solutions.

DEMOGRAPHIC INFORMATION

The demographic profile of the respondents was assessed based on gender, age, education level, and work experience to provide a comprehensive understanding of the sample distribution. The majority of respondents were male (63%, N=205), while female participants constituted the remaining 37% of the sample. In terms of age, a significant portion of the respondents were below 25 years old (62%, N=205), followed by those aged 25 to 35 years (28%) and a smaller percentage above 35 years (10%).

Regarding educational qualifications, the majority of participants held a bachelor's degree (55%, N=205), while 30% had a master's degree and the remaining 15% possessed other qualifications such as diplomas or associate degrees. This distribution reflects the typical educational background of employees working in the IT sector. In terms of work experience, the highest proportion of employees had one to two years of experience (71%, N=205), indicating a relatively young workforce. Additionally, 18% of respondents had less than one year of experience, whereas 11% had more than two years of experience. This suggests that the IT sector in Pakistan employs a significant number of early-career professionals, highlighting the importance of employee engagement strategies to retain talent within the industry.

DATA ANALYSIS PRELIMINARY ANALYSIS

Table 4.1 presents the mean, standard deviation, reliability (Cronbach's alpha), and correlation among the study variables. The mean scores for perceived organizational support (POS), turnover intention (TI), work engagement (WE), workplace bullying (WPB), and AI-powered employee engagement solutions (AI-EES) indicate that responses generally fall within a neutral to positive range. The mean values for POS (3.41), WE (3.61), and AI-EES (3.75) suggest that employees perceive moderate support from their organizations, engage relatively well in their work, and have a positive outlook on AI-driven HR solutions. In contrast, workplace bullying (mean = 2.51) remains lower, reflecting that it is not a widespread issue for most respondents.

POS maintains a significant negative correlation with turnover intention (γ = -0.36, $p < 0.01$), indicating that employees who perceive greater organizational support are less likely to consider leaving their jobs. Additionally, POS is positively correlated with WE (γ = 0.40, $p < 0.01$), confirming that employees who feel valued and supported tend to be more engaged in their work. Conversely, WPB shows a positive correlation with TI (γ = 0.37, $p < 0.01$), reinforcing the idea that workplace bullying increases the likelihood of employees wanting to leave.

AI-powered employee engagement solutions exhibit a positive correlation with POS (γ = 0.42, $p < 0.01$) and WE (γ = 0.45, $p < 0.01$), suggesting that organizations utilizing AI-driven HR tools enhance employees' perceived support and engagement levels. Furthermore, AI-EES maintains a negative correlation with TI (γ = -0.33, $p < 0.01$), implying that employees who benefit from AI-driven feedback and support systems are less inclined to consider leaving their jobs.

The reliability of all constructs is within the acceptable range (0.67 to 0.81), confirming the internal consistency of the measurement scales (Bădulescu et al., 2021; Furr, 2017). These findings collectively reinforce the significance of perceived support, engagement, and AI-driven HR interventions in shaping workplace experiences and reducing turnover intentions.

Table 4.1. Mean, standard deviation, α and correlation among variables

Variables	*Mean*	*S.D*	*α*	*1*	*2*	*3*	*4*	*5*
1. POS	*3.41*	*0.75*	*0.81*	*1*				
2. TI	*3.38*	*0.96*	*0.67*	*-0.36***	*1*			

3. WE	*3.61*	*0.58*	*0.66*	*0.40***	*-0.09*	*1*	
4. WPB	*2.51*	*0.86*	*0.77*	*-0.30***	*0.37***	*-0.11*	*1*
5. AI-EES	*3.75*	*0.72*	*0.79*	*0.42***	*-0.33***	*0.45***	*-0.28***
1							

Note: ***POS*** *= Perceived Organizational Support,* ***TI*** *= Turnover Intention,* ***WE*** *= Work Engagement,* ***WPB*** *= Workplace Bullying,* ***AI-EES*** *= AI-Powered Employee Engagement Solutions, α = reliability. $p < 0.01$.*

HYPOTHESES TESTING

Table 4.2 presents the results of hypothesis testing, using the coefficient β to indicate the extent of change in the outcome variable for each unit change in the predictor variable. A positive β value signifies that an increase in the predictor variable leads to a proportional increase in the outcome variable, while a negative β value indicates an inverse relationship. The p-value determines the statistical significance of these relationships.

The results indicate that workplace bullying (WPB) has a significant positive effect on turnover intention (TI) ($\beta = 0.39$, $p < 0.01$), suggesting that employees experiencing bullying are more likely to consider leaving their jobs. Perceived organizational support (POS) positively influences work engagement (WE) ($\beta = 0.31$, $p < 0.01$), indicating that employees who perceive greater organizational support tend to be more engaged. Additionally, POS negatively affects turnover intention ($\beta = -0.43$, $p < 0.01$), reinforcing the notion that higher organizational support reduces the likelihood of employees leaving.

The findings also introduce the role of AI-powered employee engagement solutions (AI-EES) as a moderating variable in the relationship between POS and WE. The results show that AI-EES significantly strengthens the positive effect of POS on WE ($\beta = 0.27$, $p < 0.01$), meaning that employees who interact with AI-driven engagement solutions perceive even stronger organizational support, leading to greater work engagement. Furthermore, AI-EES negatively correlates with turnover intention ($\beta = -0.29$, $p < 0.01$), suggesting that AI-based HR tools contribute to retaining employees by enhancing their engagement and reducing dissatisfaction.

However, the effect of work engagement on turnover intention ($\beta = -0.17$, $p = 0.15$) remains statistically insignificant, indicating that engagement alone may not be a strong determinant of turnover without additional organizational interventions.

TABLE 4.2: RESULTS OF HYPOTHESIS TESTING

Hypothesis Relationship	R^2	β	*p*	*Result*
WPB → WE	*0.01*	*-0.08*	*0.09*	*Not supported*
WPB → TI	*0.12*	*0.39*	*0.00*	*Supported*
POS → WE	*0.17*	*0.31*	*0.00*	*Supported*
POS → TI	*0.11*	*-0.43*	*0.00*	*Supported*
WE → TI	*0.01*	*-0.17*	*0.15*	*Not supported*
AI-EES→WE (Moderation)	*0.14*	*0.27*	*0.00*	*Supported*
AI-EES → TI	*0.09*	*-0.29*	*0.00*	*Supported*

Note: *POS = Perceived Organizational Support; TI = Turnover Intention; WE = Work Engagement; WPB = Workplace Bullying; AI-EES = AI-Powered Employee Engagement Solutions.*

These findings highlight the critical role of AI-powered engagement tools in reinforcing organizational support and reducing turnover intentions. The results suggest that while workplace bullying increases turnover risks, AI-driven HR solutions can act as a strategic intervention to improve engagement and enhance retention efforts.

MEDIATION ANALYSIS (WPB AS AN INDEPENDENT VARIABLE)

Mediation analysis was conducted following Baron and Kenny's (1986) criteria, which require: (a) a significant association between the independent and dependent variables, (b) a significant association between the independent variable and the mediating variable, and (c) a significant association between the mediating variable and the dependent variable. If these conditions are met, mediation occurs, indicating that the mediator explains part or all of the relationship between the independent and dependent variables.

In this study, the results indicate that the conditions for mediation were not met. Specifically, while workplace bullying (WPB) has a significant direct effect on turnover intention (TI) ($\beta = 0.39$, $p < 0.01$), its relationship with work engagement (WE) is not statistically significant ($\beta = -0.10$, $p = 0.09$). Moreover, work engagement does not significantly predict turnover intention ($\beta = -0.17$, $p = 0.15$), failing to establish the required link for mediation.

The absence of mediation suggests that work engagement does not

significantly mediate the relationship between workplace bullying and turnover intention. This means that workplace bullying directly influences employees' turnover intentions rather than doing so through its effects on engagement. These findings indicate that other organizational factors, such as perceived organizational support (POS) and AI-driven engagement solutions, may play a more substantial role in mitigating the adverse effects of workplace bullying on turnover intention.

Additionally, Table 4.3 shows that with the inclusion of work engagement as a mediator, the beta coefficient for workplace bullying on turnover intention decreases slightly (from β = 0.39 to β = 0.38), but the indirect effect remains statistically insignificant. This further confirms that work engagement does not mediate the effect of workplace bullying on turnover intention.

TABLE 4.3: MEDIATION RESULTS

Variables	***M1 (β)***	***M2 (β)***	***M3 (β)***
Step 1: Control Variables			
Gender	*0.08*	*0.04*	*0.05*
Age	*-0.18*	*-0.16*	*-0.15*
Qualification	*0.01*	*0.03*	*0.03*
Tenure	*-0.04*	*0.06*	*0.06*
Step 2: Independent Variable			
WPB → TI	*0.39***	*0.38***	-
Step 3: Mediating Variable			
WE → TI	-	-	*-0.10*
R^2	*0.023*	*0.133*	*0.137*
ΔR^2	-	*0.11*	*0.004*

Note: *WPB = Workplace Bullying; TI = Turnover Intention; WE = Work Engagement.* ***p < 0.01*** *(significant).*

These findings emphasize the need for direct interventions to address workplace bullying, as its impact on turnover intention is not significantly mitigated by work engagement. Organizations should focus on proactive strategies, such as AI-powered employee engagement tools and strong organizational support mechanisms, to minimize the negative consequences of bullying on employee retention.

MEDIATION ANALYSIS (POS AS AN INDEPENDENT VARIABLE)

Similar to the previous mediation analysis, this section examines whether work engagement (WE) mediates the relationship between perceived organizational support (POS) and turnover intention (TI). Mediation analysis follows Baron and Kenny's (1986) criteria, which require: (a) a significant association between the independent and dependent variables, (b) a significant association between the independent variable and the mediating variable, and (c) a significant association between the mediating variable and the dependent variable for mediation to occur.

The results indicate that POS has a significant direct effect on turnover intention ($\beta = -0.412$, $p < 0.01$), confirming that employees who perceive high organizational support are less likely to consider leaving. However, the effect of POS on work engagement is not statistically significant ($\beta = 0.071$, $p = 0.08$), meaning that while POS generally enhances engagement, the relationship is not strong enough to establish mediation. Additionally, work engagement does not significantly predict turnover intention ($\beta = -0.075$, $p = 0.09$), failing to meet the final mediation condition.

As seen in Table 4.4, the beta value of POS on turnover intention slightly increases (from $\beta = -0.412$ to $\beta = -0.435$) with the inclusion of work engagement, but this effect remains statistically insignificant. This confirms that work engagement does not mediate the relationship between POS and turnover intention. Instead, POS directly influences turnover intention, reinforcing the importance of organizational support in reducing employee attrition.

Table 4.4: Mediation Results

Variables	***M1 (β)***	***M2 (β)***	***M3 (β)***
Step 1: Control Variables			
Gender	*0.081*	*0.108*	*0.102*
Age	*-0.184*	*-0.079*	*-0.075*
Qualification	*0.011*	*0.028*	*0.028*
Tenure	*-0.039*	*0.034*	*-0.035*
Step 2: Independent Variable			
POS → TI	*0.412***	*-0.435***	-
Step 3: Mediating Variable			

Variables	M1 (β)	M2 (β)	M3 (β)
WE → TI	-	-	*0.071*
R^2	*0.023*	*0.125*	*0.127*
ΔR^2	-	*0.102*	*0.002*

Note: *POS = Perceived Organizational Support; TI = Turnover Intention; WE = Work Engagement.* $p < 0.01$ *(significant).*

These findings highlight that perceived organizational support directly reduces turnover intention, but its effect is not mediated through work engagement. This suggests that while POS plays a critical role in retaining employees, other factors—such as AI-powered employee engagement solutions—may further enhance work engagement and retention. Future research should explore how technological interventions can strengthen the link between POS and employee engagement, ultimately improving retention strategies.

MODERATION ANALYSIS (AI-POWERED EMPLOYEE ENGAGEMENT SOLUTIONS AS A MODERATOR)

A moderation analysis was conducted to examine whether AI-powered employee engagement solutions (AI-EES) influence the strength of the relationship between perceived organizational support (POS) and work engagement (WE). Moderation analysis differs from mediation, as it does not explain how one variable affects another but rather under what conditions the relationship is strengthened or weakened (Baron & Kenny, 1986).

To test moderation, an interaction term (POS × AI-EES) was created, following the standard procedure for moderation analysis using hierarchical regression. The presence of a significant interaction effect would indicate that AI-powered engagement solutions modify the relationship between POS and WE, either amplifying or weakening it.

The results in Table 4.5 reveal that POS has a significant positive effect on WE (β = 0.31, p < 0.01), indicating that employees who perceive greater organizational support tend to have higher work engagement. AI-EES itself also has a direct positive impact on WE (β = 0.35, p < 0.01), suggesting that AI-driven HR interventions contribute independently to engagement levels.

Most importantly, the interaction term (POS × AI-EES) is significant (β = 0.27, p < 0.01), confirming that AI-powered employee engagement solutions moderate the relationship between POS and WE. The positive coefficient

indicates that the relationship between POS and WE is stronger when AI-powered engagement tools are effectively integrated into HR practices. This suggests that employees who receive both high organizational support and AI-driven engagement interventions report the highest levels of work engagement.

TABLE 4.5: MODERATION ANALYSIS RESULTS

Variables	***M1 (β)***	***M2 (β)***	***M3 (β)***
Step 1: Control Variables			
Gender	*0.071*	*0.082*	*0.077*
Age	*-0.159*	*-0.147*	*-0.141*
Qualification	*0.019*	*0.023*	*0.021*
Tenure	*-0.042*	*-0.038*	*-0.033*
Step 2: Independent Variables			
POS → WE	*0.31***	*0.29***	*0.28***
AI-EES → WE	*0.35***	*0.33***	*0.32***
Step 3: Interaction Effect			
POS × AI-EES	-	-	*0.27***
R^2	*0.18*	*0.23*	*0.27*
ΔR^2	-	*0.05*	*0.04*

Note: *POS = Perceived Organizational Support; AI-EES = AI-Powered Employee Engagement Solutions; WE = Work Engagement.* $p < 0.01$ *(significant).*

These results provide strong empirical support for the hypothesis that AI-driven engagement tools strengthen the impact of POS on WE. Organizations that integrate AI-powered solutions into HR management can enhance employees' perceived support and engagement more effectively than through traditional methods alone. This finding highlights the strategic importance of AI technologies in shaping modern HR practices and improving employee retention.

DISCUSSION AND IMPLICATIONS

This study investigates the key factors influencing employee turnover, with a particular emphasis on the moderating role of AI-powered employee engagement solutions (AI-EES) in the relationship between perceived

organizational support (POS) and work engagement (WE). Additionally, it explores whether work engagement mediates the association between workplace bullying (WPB), POS, and turnover intention (TI). The empirical analysis involved meticulous data screening, including assessments for missing values, outlier detection, and normality evaluation based on skewness (±1) and kurtosis (±3), ensuring compliance with normal distribution criteria (Byrne, 2010).

The results strongly support Hypothesis 2 (H2), indicating a significant positive relationship between workplace bullying and turnover intention. Employees who experience bullying in the workplace are more likely to consider resigning, underscoring the urgency for organizations to implement proactive measures to identify and mitigate bullying behaviors. This aligns with prior research that suggests a toxic work environment heightens stress, lowers job satisfaction, and ultimately increases voluntary turnover (Einarsen et al., 2020).

The study also validates Hypothesis 3 (H3), confirming that POS has a substantial positive effect on work engagement. Employees who perceive their organization as supportive tend to exhibit higher commitment and enthusiasm toward their roles. This underscores the importance of organizational policies that prioritize employee recognition, career growth opportunities, and psychological safety to enhance commitment levels. Additionally, findings support Hypothesis 4 (H4), indicating that POS negatively correlates with turnover intention—employees with greater perceived support are less inclined to leave their jobs. These results highlight the need for organizations to cultivate an inclusive and supportive work culture, as employees who feel valued by their employers demonstrate greater loyalty and job satisfaction.

However, empirical evidence does not support Hypothesis 5 (H5), which proposed that work engagement directly affects turnover intention. While prior studies suggest that engaged employees are less likely to leave, the findings of this study indicate that work engagement alone is insufficient to influence retention. Instead, external factors such as job security, compensation, career advancement, and work-life balance may play a more decisive role in determining whether an employee remains with an organization.

The mediation analysis further revealed challenges in establishing a significant indirect effect of work engagement on the relationship between workplace bullying and turnover intention. According to Baron and Kenny's (1986) mediation criteria, a significant association between the independent, mediating, and dependent variables is necessary for mediation to occur.

However, these conditions were not fully met in this study. The non-significant effect of work engagement on turnover intention suggests that other workplace and environmental factors may exert a stronger influence on employee retention. This finding aligns with cultural perspectives, particularly within Pakistan's IT sector, where employees are often highly task-oriented, making the differentiation between engagement and routine job performance less distinct (Sidiki & Maqsood, 2008).

A key contribution of this study is the identification of AI-powered employee engagement solutions (AI-EES) as a moderating factor in HR practices. The results provide robust evidence for Hypothesis 6 (H6), indicating that AI-EES strengthens the positive relationship between POS and WE. Employees who benefit from AI-driven real-time feedback, personalized career development support, and automated engagement systems perceive higher levels of organizational backing, which enhances their work engagement. Furthermore, AI-EES demonstrated a direct negative impact on turnover intention, reinforcing its potential as a strategic HR tool for employee retention. By leveraging AI-powered HR interventions, organizations can cultivate a more responsive, data-driven, and personalized employee experience, ultimately fostering long-term workforce commitment.

IMPLICATIONS FOR THEORY AND PRACTICE

The findings of this study offer valuable contributions to both theoretical and practical discussions on employee engagement, turnover intention, and the role of AI-powered employee engagement solutions in contemporary HR practices. From a theoretical perspective, this research expands Organizational Support Theory (OST) by integrating AI-driven engagement tools as a crucial factor influencing employees' perceptions of organizational support and commitment. While traditional HR models primarily focus on managerial and interpersonal support, this study demonstrates that AI-powered interventions provide scalable, data-driven alternatives that enhance the overall employee experience. Additionally, the research challenges conventional beliefs regarding the direct relationship between work engagement and turnover intention, suggesting that engagement alone may not serve as a strong predictor of employee retention. Instead, factors such as job security, compensation, and career development opportunities may play a more decisive role in employees' decisions to remain with or leave an organization.

The study emphasizes the significance of utilizing AI-driven HR tools to enhance employee retention strategies. AI-powered engagement platforms equipped with real-time feedback mechanisms and predictive analytics enable organizations to identify employees at risk of disengagement and take proactive measures to address their concerns. By incorporating AI-driven employee engagement solutions, organizations can foster a more personalized and responsive work environment, strengthening the connection between employees and employers. Moreover, given the strong correlation between workplace bullying and turnover intention, the study underscores the need for anti-bullying policies and workplace well-being programs. To mitigate workplace toxicity and create an inclusive culture, organizations must establish strict policies, reporting systems, and AI-based monitoring mechanisms.

The research further highlights the importance of enhancing perceived organizational support (POS) through structured mentorship programs, career development initiatives, and work-life balance policies. AI-powered HR platforms can contribute significantly by offering tailored career growth plans and continuous feedback loops, ensuring that employees feel valued and supported in their professional roles. Given the study's findings on the limited direct effect of work engagement on turnover intention, HR professionals should expand their focus beyond engagement to include leadership development, competitive compensation structures, and job stability to effectively retain employees.

Finally, this study highlights the necessity of cultural and industry-specific factors when formulating employee engagement strategies. The findings suggest that engagement models commonly applied in Western corporate environments may not seamlessly translate into other cultural contexts, such as Pakistan's IT sector. Consequently, organizations must customize their HR interventions to align with employees' expectations, work habits, and career aspirations within their specific regional and industry contexts. By strategically integrating AI-driven HR solutions, fostering strong organizational support, and maintaining ethical workplace policies, organizations can build a sustainable and highly engaged workforce, ultimately reducing turnover rates and driving overall productivity.

CONCLUSION

This study explores the key determinants of employee turnover intention, with a particular focus on the role of AI-powered employee engagement

solutions (AI-EES), perceived organizational support (POS), workplace bullying (WPB), and work engagement (WE). The findings highlight that workplace bullying significantly contributes to turnover intention, emphasizing the necessity for organizations to cultivate a supportive and inclusive work environment. Employees subjected to bullying are more likely to disengage and consider alternative employment, reinforcing the importance of proactive interventions to enhance retention.

Furthermore, the study underscores the crucial role of perceived organizational support in fostering employee engagement and mitigating turnover intention. Employees who perceive their organization as supportive demonstrate higher levels of commitment and are less inclined to leave. This finding suggests that structured support mechanisms, such as mentorship programs and career development opportunities, are essential for talent retention. Contrary to previous research that establishes a strong link between work engagement and turnover intention, the present study found no direct correlation. This indicates that other organizational factors, including job security, compensation, and leadership support, may exert a more substantial influence on employees' decisions to remain with or leave an organization.

A key contribution of this research is the identification of AI-powered employee engagement solutions as a moderating variable. The results reveal that AI-driven HR tools significantly enhance the relationship between POS and WE, demonstrating that organizations integrating AI-based engagement strategies can elevate employee experiences, offer real-time feedback, and improve retention efforts. Additionally, AI-EES directly reduces turnover intention, suggesting that these technological interventions can serve as a strategic mechanism for minimizing voluntary employee departures. Organizations aiming to strengthen employee engagement and retention should prioritize AI-driven HR solutions, enforce anti-bullying policies, and foster a culture of organizational support. Future research should explore the long-term impact of AI-powered HR technologies across diverse industries to refine best practices for employee engagement in the evolving digital landscape.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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